

## Elementary Algebra

There are 12 questions administered on the Elementary Algebra test, divided into the following content areas:

- Numbers and quantities. Topics include integers and rational numbers, computation with integers and negative rationals, absolute value, and ordering.
- Algebraic expressions. Topics include evaluation of simple formulas and expressions, adding and subtracting monomials and polynomials, multiplying and dividing monomials and polynomials, evaluating positive rational roots and exponents, simplifying algebraic fractions, and factoring.
- Problem solving. Topics include translating written phrases into algebraic expressions, solving linear equations and inequalities, quadratic equations (by factoring), and verbal problems presented in an algebraic context.

## Elementary Algebra Sample Questions

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. If  $A$  represents the number of apples purchased at 15 cents each, and  $B$  represents the number of bananas purchased at 10 cents each, which of the following represents the total value of the purchases in cents?
  - A.  $A + B$
  - B.  $25(A + B)$
  - C.  $10A + 15B$
  - D.  $15A + 10B$
2.  $\sqrt{2} \times \sqrt{15} = ?$ 
  - A.  $\sqrt{17}$
  - B.  $\sqrt{30}$
  - C. 17
  - D. 30
3. What is the value of the expression  $2x^2 + 3xy - 4y^2$  when  $x = 2$  and  $y = -4$ ?
  - A.  $-80$
  - B.  $-32$
  - C. 32
  - D. 80
4. In the figure below, both circles have the same center, and the radius of the larger circle is  $R$ . If the radius of the smaller circle is 3 units less than  $R$ , which of the following represents the area of the shaded region?



- A.  $\pi R^2$
  - B.  $\pi(R - 3)^2$
  - C.  $\pi R^2 - \pi \times 3^2$
  - D.  $\pi R^2 - \pi(R - 3)^2$
5.  $(3x - 2y)^2 =$ 
    - A.  $9x^2 - 4y^2$
    - B.  $9x^2 + 4y^2$
    - C.  $9x^2 - 6xy + 4y^2$
    - D.  $9x^2 - 12xy + 4y^2$

6. If  $x > 2$ , then  $\frac{x^2 - x - 6}{x^2 - 4} =$

- A.  $\frac{x-3}{2}$
- B.  $\frac{x-3}{x-2}$
- C.  $\frac{x-3}{x+2}$
- D.  $\frac{3}{2}$

7.  $\frac{4 - (-6)}{-5} =$

- A. -2
- B.  $-\frac{2}{5}$
- C.  $\frac{2}{5}$
- D. 2

8. If  $2x - 3(x + 4) = -5$ , then  $x =$

- A. -17
- B. -7
- C. 7
- D. 17

9.  $-3(5 - 6) - 4(2 - 3) =$

- A. -7
- B. -1
- C. 1
- D. 7

10.  $20 - \frac{4}{5}x \geq 16$

Which of the following inequalities is equivalent to the inequality shown above?

- A.  $x \leq 5$
- B.  $x \geq 5$
- C.  $x \leq \frac{65}{2}$
- D.  $x \geq \frac{65}{2}$

11. Which of the following lists of numbers is ordered from least to greatest?

- A.  $-\frac{1}{3}, -\frac{3}{5}, \frac{2}{3}, \frac{3}{5}$
- B.  $-\frac{3}{5}, -\frac{1}{3}, \frac{3}{5}, \frac{2}{3}$
- C.  $-\frac{1}{3}, -\frac{3}{5}, \frac{3}{5}, \frac{2}{3}$
- D.  $-\frac{3}{5}, -\frac{1}{3}, \frac{2}{3}, \frac{3}{5}$

12. If  $5t + 2 = 6$ , then  $t =$

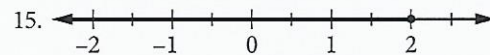
- A. 8
- B.  $\frac{5}{4}$
- C.  $\frac{4}{5}$
- D. -8

13. For which of the following equations are  $x = 5$  and  $x = -5$  both solutions?

- A.  $x^2 + 25 = 0$
- B.  $x^2 - 25 = 0$
- C.  $x^2 + 10x - 25 = 0$
- D.  $x^2 - 5x - 25 = 0$

14. If  $x \neq 0$ , then  $\frac{u}{x} + \frac{5u}{x} - \frac{u}{5x} =$

- A.  $\frac{7x}{5u}$
- B.  $\frac{5u}{7x}$
- C.  $\frac{29u}{5x}$
- D.  $\frac{31u}{5x}$



The solution set of which of the following inequalities is graphed on the number line above?

- A.  $2x - 4 \geq -3$
- B.  $2x + 5 \leq 6$
- C.  $3x - 1 \leq 5$
- D.  $4x - 1 \geq 7$

16.  $2x + 6y = 5$   
 $x + 3y = 2$

How many solutions  $(x, y)$  are there to the system of equations above?

- A. None
- B. One
- C. Two
- D. More than two

17. Which of the following is a factor of both  $x^2 - x - 6$  and  $x^2 - 5x + 6$ ?

- A.  $x - 3$
- B.  $x - 2$
- C.  $x + 2$
- D.  $x + 3$

18.  $\frac{10x^6 + 8x^4}{2x^2} =$

- A.  $9x^{12}$
- B.  $14x^4$
- C.  $5x^4 + 4x^2$
- D.  $5x^3 + 2x^2$

19. A rectangular yard has area 96 square feet. If the width of the yard is 4 feet less than the length, what is the perimeter, in feet, of the yard?

- A. 40
- B. 44
- C. 48
- D. 52

20. On Monday, it took Helen 3 hours to do a page of science homework exercises. The next day she did the same number of exercises in 2 hours. If her average rate on Monday was  $p$  exercises per hour, what was her average rate the next day, in terms of  $p$ ?

- A.  $2(p + 1)$  exercises per hour
- B.  $3(p - 1)$  exercises per hour
- C.  $\frac{2}{3}p$  exercises per hour
- D.  $\frac{3}{2}p$  exercises per hour

# Answer Key

ELEMENTARY ALGEBRA	
QUESTION NUMBER	CORRECT ANSWER
1	D
2	B
3	A
4	D
5	D
6	B
7	A
8	B
9	D
10	A
11	B
12	C
13	B
14	C
15	C
16	A
17	A
18	C
19	A
20	D